

Sushruta: The Father of Indian Surgical History

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The legacy and impact of Sushruta and his magnum opus, the *Sushruta Samhita*, have been long lasting and still felt to this day.¹⁻³ As mentioned by Dave et al,¹ Sushruta was one of the originators of nasal reconstruction and an advocate for mentorship, simulated training, and a myriad of different surgical techniques.^{1,4-8} The authors should be commended for probing the practices of one of the most impactful and prolific surgeons in history, whose contributions to surgery span far beyond plastic surgery alone.

Dave et al and others have highlighted education of his students as one of Sushruta's core tenets, as reflected by his words "theory without practice is like a one-winged bird that is incapable of flight."^{1,5} Instructed by this belief, Sushruta created and frequently used many practical simulation sessions for his students. He valued human dissection as paramount to surgical training. His students practiced suturing and incisions on animal carcasses and vegetables, practiced rudimentary evacuations on leather bags full of fluid, and simulated the steps of his landmark nasal reconstruction using leaves and clay.^{1,8} Examples of simulated practice are well-illustrated in the present article.¹ Because competency-based education becomes increasingly prevalent in surgical training,⁹ simulation education has become a larger part of the conversation surrounding plastic surgery education.^{7,10} However, the state of simulation education in the field of plastic surgery is vastly inferior to our general surgery colleagues.^{7,10} Although growing, the number of plastic surgery specific simulators is well below that used by other surgical specialties.⁷ Given the inclination to initiate a future release of specialty-wide entrustable professional activities,⁹ it is imperative to promote and fund further development of simulation practices. The authors highlight Sushruta's predilection for simulated hands-on activities, which has a clear role as we incorporate these ideas into current surgical education.

The authors point out Sushruta's use of various medicinal herbs in accordance to Ayurvedic medical practices.¹ The *Sushruta Samhita* is one of the foundational texts that underlies all Ayurvedic medicine; as a

result, many of Sushruta's practices are inherently intertwined with Ayurvedic teachings.³ The authors mention the *Sutra Sthana* portion of the *Sushruta Samhita* and how it details aseptic principles.^{1,3} One of these practices is called Dhoopana, or herbal fumigation, which is done to sanitize the air.^{1,3,11} In recent years, there have been studies into a number of Ayurvedic practices, including Dhoopana, to test and see if they stand up to scientific rigor.^{2,11} Bhatwalkar et al¹¹ investigated herbal fumigation as a potential protocol to reduce healthcare associated infections and found that a number of herbs did statistically significantly reduce the airborne bacterial count in fumigated air when compared with nonfumigated air. Studies, such as the present one, which revisit the origin of surgical practice enable us to critically assess current practice. Re-evaluation of old observations may well lead to "new" innovations in surgical care.

However, re-evaluation of the origins of surgery should not end with Sushruta. There are a myriad of other historical figures in medicine that we could learn from, particularly those outside of Western canon.¹² Al-Zahrawi (also known in the latinized Abulcasis) wrote the *Kitab Al-Tasrif*, which went on to become a foundation of many Western medical practices.¹²⁻¹⁵ His advancements in gynecomastia surgery, as well as identifying postoperative hematoma as the primary complication of gynecomastia surgery, have advanced the use of compression dressing and careful hemostasis as part of common surgical practice.¹⁵ Al-Zahrawi also popularized the use of silk suture to better approximate wounds to improve the cosmesis of wounds and surgical incisions.¹³ And just like Sushruta, Al-Zahrawi invented a number of surgical instruments.¹³ There is also Ibn Sina (also known in the latinized Avicenna) who wrote *Al-Qanoon*.^{12,16-18} His works on trauma were monumental, and some laid the foundation for many practices that are continued to this day. He was the first to describe a Bennett fracture even though we credit Bennett with the name.¹⁷ One article in particular looked at Ibn Sina's protocols related to cranial fractures and traumatic brain injuries.¹⁸ Vaghebin et al conducted a review of Ibn Sina's treatment and investigated various procedures and treatments used by Ibn Sina when treating a patient with traumatic brain injury compared with current literature. They noted how certain practices can be supported by modern science and how some practices have yet to be explored.¹⁸ This could be a template to explore numerous surgical contributions made by Sushruta and other past physician's practices to identify areas for current surgical improvement.

The authors should be commended for re-exploring this critical period in surgical history and punctuating the

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Received for publication September 4, 2024; accepted September 24, 2024.

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DOI: 10.1097/GOX.00000000000006309

Disclosure statements are at the end of this article, following the correspondence information.

practices of Sushruta. Sushruta remains one of the pre-eminent figures in surgical history, and the impact of his contributions continue to affect current surgical education and practice. The origins of surgery provide other prescient innovators, and similar investigation into their contributions will help current surgeons to appreciate the origin of our discipline and to continue to build on these contributions to drive future surgical development.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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